



Enzymatic silk degumming

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Enzymatic silk degumming

Silk degumming or silk desizing or removal of sericin from silk (all three terms covering the same process) is conventionally carried out by treatment with a boiling soap solution. This degumming can be carried out both on the silk threads before weaving and on the finished woven silk fabric, whereby the latter treatment is the most important.

It has been reported in the published technical literature (M Minagawa: 'SEN'I TO KOGYO', Vol 5 (No 1), pp 26-38 (1972), that silk yarn can be degummed enzymatically, using neutral *Bacillus* protease at pH 6-7, or alkaline *Bacillus* protease at pH 9-10, but with woven silk (crepe) only poor degumming was found with alkaline *Bacillus* protease at pH 9-10. Good degumming effect on woven silk with alkaline *Bacillus subtilis* protease has been reported (H Iida: 'SEN'I KAKO', Vol 23 (No 7), pp 485-489 (1971) and Vol 23 (No 8), pp 578-584 (1971)), but it was found that a low pH had to be used (pH 7.5 - 8.0 at 50 - 60° C), only light-weight woven silk was used (weight 31.87 g/sq meter, 32 x 32 threads/cm), and pre-treatment had to be used (10 minutes at 80° C).

It has been found that other alkali-stable proteases possess excellent silk degumming activity, ie the proteases described in US Patent No 3,723,250 (NOVO INDUSTRI A/S, Copenhagen), eg the commercial products ESPERASE and SAVINASE. This process has been carried out at a pH and with contents of other ingredients (builders, surfactants, etc) similar to those used industrially (see, eg M Minagawa: 'KINU NO KAGAKU', Kansai Koromo Seikatsu Kenkyu Kai, Osaka (1981)). It has been found that these other alkali-stable enzymes are well suited for degumming, not only of silk yarn and lightweight woven silk as described above, but also of heavyweight woven silk which cannot be satisfactorily degummed by previously known enzymatic methods. The enzymatic treatment with these other alkali-stable proteases can be carried out at a pH from 7 to 11 (preferably around pH 10), and at a temperature from ambient to 70° C (preferably around 60° C).

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